

Comparison of embryo biopsies for PGT-A between fresh and vitrified-warmed embryo on pregnancy complications and resulting newborns

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【Purpose】 There are two types of embryo biopsies for preimplantation genetic testing for aneuploidy (PGT-A): fresh embryo biopsy and vitrified-warmed embryo biopsy. The numbers of vitrification process are different between the two procedures. Fresh biopsy requires one time vitrification process before embryo transfer, however vitrified-warmed biopsy requires twice. Although fresh embryo biopsy is beneficent to the patient from the point of the numbers of vitrification, the patients who saved cryopreserved blastocysts have no other choice for PGT-A. On the other hand, the difference between the two procedures on pregnancy prognosis is not determined. Therefore, the present study retrospectively examined whether the difference between embryo biopsy on fresh and vitrified-warmed blastocysts with reference to the onset of maternal complications during pregnancy and the resulting newborn babies.

【Methods】 One hundred twenty eight patients, from March 2020 to September 2023, who gave birth by PGT-A euploid embryos were divided into 70 cycles of fresh biopsies (Group F) and 68 cycles of vitrified biopsies (Group C). Maternal complications (gestational hypertension, gestational diabetes, placenta previa, premature rupture of membranes, placenta accreta, placental abruption and atonic bleeding) and data of new born babies (height, weight, and congenital anomaly) were examined retrospectively and compared to the control (group ART). Five hundred seventy-eight vitrified-warmed transfer resulted in live birth by single vitrified-warmed single embryo transfer within the same period were assigned to the control. In addition, multivariate analyses were performed using the patient's age at the time of transfer, BMI, and endometrial preparation as regulatory factors.

【Results】 There were no differences in pregnancy complications among 24.3% (17/70) vs. 25.0% (17/69) vs. 22.0% (127/578) in group F, C, and ART, respectively. The birth data showed birth-weight: $2988.3 \pm 510.1\text{g}$ vs. $3070 \pm 461.2\text{g}$ vs. $3064.2 \pm 458.0\text{g}$, height: $48.5 \pm 3.1\text{cm}$ vs. $48.9 \pm 2.4\text{cm}$ vs. $48.8 \pm 2.3\text{cm}$, and congenital anomaly rate: 4.3% (3/70) vs. 1.5% (1/68) vs. 1.4% (8/578), respectively and any significant difference was not determined.

【Conclusion】 Maternal complications and perinatal outcome from the PGT-A pregnancies with the embryos after either fresh embryo biopsy or vitrified-warmed embryo biopsy did not show any significant differences. Biopsy on vitrified-warmed embryo is an option of biopsy without significant risks for PGT-A.

PGT-A の新鮮胚生検と凍結融解胚生検が母体合併症と出生児に与える影響の検討

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【目的】 PGT の胚生検は新鮮胚生検と凍結融解胚生検がある。両者の違いは胚移植前における凍結融解操作が新鮮胚生検で 1 回、凍結融解胚生検で 2 回となる。そのため、新鮮胚生検は第一選択となるが、凍結保存胚は新規採卵の必要なく患者の負担が少ない。一方、両者の違いが妊娠予後に与える影響は明らかになっていない。そこで、本研究は新鮮胚生検と凍結融解胚生検の違いが母体合併症の発症と出生児に与える影響を後方視的に検討した。

【方法】 2020 年 3 月から 2023 年 9 月までに PGT-A により妊娠後分娩に至った 128 症例 138 周期を対象に新鮮胚生検を施行した (F 群) 70 周期と凍結融解胚生検を施行した (C 群) 68 周期に分けた。同一期間内に単一凍結融解胚盤胞胚移植により分娩に至った 578 周期 (ART 群) を対象区とし、母体合併症 (妊娠高血圧症候群、妊娠糖尿病、前置胎盤、早期前期破水、癒着胎盤、常位胎盤早期剥離、弛緩出血) と出生児データ (身長、体重、先天異常) を後方視的に検討した。なお、各検討は移植時の患者年齢、BMI、子宮内膜準備法を調節因子とした多変量解析を行った。

【結果】 母体合併症は F 群、C 群、ART 群でそれぞれ 24.3% (17/70) vs 25.0% (17/69) % vs 22.0% (127/578) で差はなかった。出生児データは F 群、C 群、ART 群で体重は $2988.3 \pm 510.1\text{g}$ vs $3070 \pm 461.2\text{g}$ vs 3064.2 ± 458.0 、身長は $48.5 \pm 3.1\text{cm}$ vs $48.9 \pm 2.4\text{cm}$ vs $48.8 \pm 2.3\text{cm}$ 、先天異常率は 4.3% (3/70) vs 1.5% (1/68) vs 1.4% (8/578) で差はなかった。

【結論】 PGT-A 胚生検を行った胚移植後妊娠の周産期転帰は、通常体外受精/顕微授精と比較し、新鮮胚生検および凍結融解胚生検ともに差がなかった。PGT-A 実施の対象として凍結保存胚も選択肢となり得る。